

## A NEW RESTORATION OF STEGOSAURUS.

---

By CHARLES W. GILMORE,

*Assistant Curator of Fossil Reptiles, United States National Museum.*

---

In a recent paper<sup>1</sup> I have reproduced ten restorations of *Stegosaurus* as depicted by various authorities between the years 1891 and 1912. These show a considerable variety of interpretations, and are of interest as exhibiting the diverse opinions held regarding its probable appearance in the flesh, and especially as to the arrangement of the dermal armor, which forms such a conspicuous feature of the external anatomy of this curious reptile. Since none of these restorations portray fully the ideas set forth in the bulletin cited above, I have recently prepared a small model of *Stegosaurus* one-twelfth linear dimensions, the proportions of the model being based upon careful measurements made from the type-specimen of *Stegosaurus stenops* Marsh now in the United States National Museum. In this model I have incorporated all of the evidence relating to its external appearance accumulated during several years' study of a large series of Stegosaurian remains, and I believe that the more important facts relating to the proper arrangement of the dermal armor has now been quite fully established.

Briefly, these facts are: That the dermal plates of opposite rows alternate, not paired; that the largest plate of the series, as shown by two individuals found in place, is above the base of the tail, not over the pelvis; that there are not more than 18<sup>2</sup> in the complete series of flat plates; that the dermal spines number four, based upon the evidence of association in six individuals; that the bases of the plates of opposite rows are comparatively close together on either side of the median line of the back; that although the evidence is not conclusive, there is every probability that the so-called gular ossicles covered the top and sides of the head and neck, as indicated in the model, rather than the throat, as represented in previous restorations. In fig. 1 is shown a drawing of the plates in alternating position, probably made under the supervision of Dr. F. A. Lucas at the time he

---

<sup>1</sup> Charles W. Gilmore, Bulletin 89, U. S. National Museum, December 31, 1914, pp. 122-126, pls. 32-36.

<sup>2</sup> In Bulletin 89, U. S. National Museum, it was stated "there are not more than 22 and perhaps only 20," but after preparing this model to scale I am now convinced that my first estimate was too large.



FIG. 1.—DERMAL PLATES OF *STEGOSAURUS STENOPS* MARSH. TYPE, NO. 4934 U. S. NATIONAL MUSEUM. ABOUT  $\frac{1}{4}$  NATURAL SIZE. THE FIRST PLATE NEAREST THE HEAD IS MISSING.

was studying the Stegosaur. It came into my hands for the first time a few days after the model was finished, and it was particularly gratifying to find that independent work should bring such close agreement in the final results. It also explains one of the difficulties encountered in making some of the earlier restorations where the body is obviously too long. This was brought about, apparently, by placing the largest plate of the series above the pelvis, which necessitated lengthening the body in order to have space for the plates which have been found in place in advance of it. In the model the presacral region is relatively shorter than has been represented in earlier restorations, but since it is based upon careful measurements made from the entire presacral series, it will be seen there is good reason for this shortening, and it is therefore in perfect accord with the evidence for the present position of the dermal armor. The angulation of the occipital condyle in relation to the longer axis of the skull in *Stegosaurus* is such as to cause the nose of the skull to be depressed if the articulated condyle is to be in line with the cervical vertebræ. While this pose allows of further depression and also of elevation of the nose, it would appear to be the more characteristic position, as shown in the model.

At this time the character of the skin covering of *Stegosaurus* is wholly conjectural, but from what is now known of the integumentary covering of some members of the Ceratopsian and Trachodont dinosaurs it is not unreasonable to expect that of *Stegosaurus* to be scale-like, with numerous bony skin ossicles scattered over the sides of the body, as indicated in the model. In the light of recent discoveries, we may yet hope to have definite knowledge as to its true nature.

The head and neck, the massive fore and hind limbs, and in fact the whole appearance of the animal indicate slow locomotion on all four feet. The exceedingly small and feeble teeth would appear to indicate that *Stegosaurus* must have fed upon the most succulent of terrestrial plants. The feet are large, as though to support the creature's weight on yielding soil. Their structure implies that they were land-haunting, doubtless of low, swampy regions rather than the upland, but they also suggest being adaptations from a group highly specialized for locomotion upon land, and there is every reason to believe that *Stegosaurus* was descended from a bipedal ancestry. Increasing bulk and development of the armor caused them to lose celerity of movement, and they became sluggish, slow-moving creatures, of low mentality, only sufficient, perhaps, to direct the mere mechanical functions of life.

#### EXPLANATION OF PLATE 52.

Model of *Stegosaurus stenops* Marsh based upon the type skeleton, Cat. No. 4934 U. S. National Museum. Right side. About  $\frac{1}{7}$  nat. size. Modeled by Charles W. Gilmore.